SEQUENCE LISTING

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Pol, Johannes M. A.

<120> INFECTIOUS CLONES OF RNA VIRUSES AND VACCINES AND DIAGNOSTIC ASSAYS DERIVED THEREOF

<130> 2183-4041.4US

<150> 09/874,626
<151> 2001-06-05

<150> 09/297,535
<151> 1999-10-12

<150> PCT/NL97/00593
<151> 1997-10-29

<160> 32

<170> PatentIn version 3.2

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ccccttaac c atg tct ggg ata ctt gat cgg tgc acg tgc acc ccc aat 230
Met Ser Gly Ile Leu Asp Arg Cys Thr Cys Thr Pro Asn
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gcc agg gtg ttt atg gcg gag ggc caa gtc tac tgc aca cga tgt ctc 278
Ala Arg Val Phe Met Ala Glu Gly Gln Val Tyr Cys Thr Arg Cys Leu
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agt gca cgg tct ctc ctt cct ctg aat ctc caa gtt cct gag ctt ggg 326
Ser Ala Arg Ser Leu Leu Pro Leu Asn Leu Gln Val Pro Glu Leu Gly
30 35 40 45

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Val Leu Gly Leu Phe Tyr Arg Pro Glu Glu Pro Leu Arg Trp Thr Leu
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Pro Arg Ala Phe Pro Thr Val Glu Cys Ser Pro Ala Gly Ala Cys Trp
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Leu Ser Ala Ile Phe Pro Ile Ala Arg Met Thr Ser Gly Asn Leu Asn
        80                  85                  90

ttt caa caa aga atg gtg cgg gtt gca gct gag att tac aga gcc ggc      518
Phe Gln Gln Arg Met Val Arg Val Ala Ala Glu Ile Tyr Arg Ala Gly
    95                  100                 105

caa ctc acc cct gca gtt ttg aag gct cta caa gtt tat gaa cgg ggt      566
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110                 115                 120                 125

tgt cgc tgg tac ccc att gtc gga cct gtc cct gga gtg gcc gtt cac      614
Cys Arg Trp Tyr Pro Ile Val Gly Pro Val Pro Gly Val Ala Val His
                130                 135                 140

gcc aac tcc cta cat gtg agt gac aaa cct ttc ccg gga gca act cat      662
Ala Asn Ser Leu His Val Ser Asp Lys Pro Phe Pro Gly Ala Thr His
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gtg tta acc aac cta ccg ctc ccg cag agg ccc aag cct gaa gac ttt      710
Val Leu Thr Asn Leu Pro Leu Pro Gln Arg Pro Lys Pro Glu Asp Phe
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tgc cct ttt gag tgt gct atg gct gac gtc tat gac att agc cat gac      758
Cys Pro Phe Glu Cys Ala Met Ala Asp Val Tyr Asp Ile Ser His Asp
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gcc gtc atg tat gtg gcc aga ggg aaa gtc tcc tgg gcc cct cgt ggc      806
Ala Val Met Tyr Val Ala Arg Gly Lys Val Ser Trp Ala Pro Arg Gly
190                 195                 200                 205

ggg gat gaa gtg aaa ttt gaa acc gtc ccc gaa gag ttg aag ttg att      854
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Ser Glu Phe Ala Phe Ile Ala Pro Gly Ser Gly Val Ser Leu Arg Val
240 245 250

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Glu His Gln His Gly Cys Leu Pro Ala Asp Thr Val Pro Glu Gly Asn
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Cys Trp Trp Cys Leu Phe Asp Leu Leu Pro Pro Glu Val Gln Asn Lys
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gaa att cgc cgt gct aac caa ttt ggc tat caa acc aag cat ggt gtc 1094
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Val Thr Asp Thr Asp Gly Pro Ile Val Val Gln Tyr Phe Ser Val Arg
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Glu Ser Trp Ile Arg His Phe Arg Leu Ala Glu Glu Pro Ser Leu Pro
335 340 345

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Gly Phe Glu Asp Leu Leu Arg Ile Arg Val Glu Pro Asn Thr Ser Pro
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Leu Gly Gly Lys Gly Glu Lys Ile Phe Arg Phe Gly Ser His Lys Trp
370 375 380

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Tyr Gly Ala Gly Lys Arg Ala Arg Arg Ala Arg Ser Gly Ala Thr Ala
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Thr Val Ala His Cys Ala Leu Pro Ala Arg Glu Ala Gln Gln Ala Lys
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Lys Leu Glu Val Ala Ser Ala Asn Arg Ala Glu His Leu Lys Tyr Tyr
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Ser Pro Pro Ala Asp Gly Asn Cys Gly Trp His Cys Ile Ser Ala Ile
430                 435                 440                 445

acc aac cgg atg gtg aat tcc aaa ttt gaa acc act ctt ccc gag aga     1574
Thr Asn Arg Met Val Asn Ser Lys Phe Glu Thr Thr Leu Pro Glu Arg
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gtg aga cct tca gat gac tgg gct act gac gag gat ctt gtg aat acc     1622
Val Arg Pro Ser Asp Asp Trp Ala Thr Asp Glu Asp Leu Val Asn Thr
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Ile Gln Ile Leu Arg Leu Pro Ala Ala Leu Asp Arg Asn Gly Ala Cys
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gct ggc gcc aag tac gtg ctc aag ctg gaa ggt gag cac tgg acc gtc     1718
Ala Gly Ala Lys Tyr Val Leu Lys Leu Glu Gly Glu His Trp Thr Val
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tct gtg acc cct ggg atg acc cct tct ttg ctc ccc ctt gaa tgt gtt     1766
Ser Val Thr Pro Gly Met Thr Pro Ser Leu Leu Pro Leu Glu Cys Val
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Met His Leu Pro Ser Ser Val Ile Pro Ala Ala Leu Ala Glu Met Ser
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Cys Ser Arg Asn Lys Ala Asn Arg Ala Thr Pro Glu Glu Val Ala Ala
625 630 635

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Lys Val Asp Gln Tyr Leu Arg Gly Ala Ala Ser Leu Gly Glu Cys Leu
640 645 650

gcc aag ctt gag agg gct cgc ccg ccg agc gcg atg gac acc tcc ttt 2198
Ala Lys Leu Glu Arg Ala Arg Pro Pro Ser Ala Met Asp Thr Ser Phe
655 660 665

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Asp Trp Asn Val Val Leu Pro Gly Val Glu Thr Ala Asp Gln Thr Thr
670 675 680 685

aaa cag ctc cat gtc aac cag tgc cgc gct ctg gtt cct gtc gtg act 2294
Lys Gln Leu His Val Asn Gln Cys Arg Ala Leu Val Pro Val Val Thr
690 695 700

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Gln Glu Pro Leu Asp Arg Asp Ser Val Pro Leu Thr Ala Phe Ser Leu
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Ser Asn Cys Tyr Tyr Pro Ala Gln Gly Asp Glu Val Arg His Arg Glu
720 725 730

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Arg Leu Asn Ser Val Leu Ser Lys Leu Glu Gly Val Val Arg Glu Glu
735 740 745

tat ggg ctc acg cca act gga cct ggc ccg cga ccc gca ctg ccg aac 2486
Tyr Gly Leu Thr Pro Thr Gly Pro Gly Pro Arg Pro Ala Leu Pro Asn
750 755 760 765

ggg ctc gac gag ctt aaa gac cag atg gag gag gat ctg ctg aaa tta 2534
Gly Leu Asp Glu Leu Lys Asp Gln Met Glu Glu Asp Leu Leu Lys Leu
770 775 780

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Val Asn Ala Gln Ala Thr Ser Glu Met Met Ala Trp Ala Ala Glu Gln
785 790 795

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Val Asp Leu Lys Ala Trp Val Lys Asn Tyr Pro Arg Trp Thr Pro Pro
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Pro Pro Pro Pro Arg Val Gln Pro Arg Lys Thr Lys Ser Val Lys Ser
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Leu Leu Glu Asn Lys Pro Val Pro Ala Pro Arg Arg Lys Val Arg Ser
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Asp Tyr Gly Ser Pro Ile Leu Met Gly Asp Asn Val Pro Asn Gly Trp
850 855 860

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Pro Met Thr Pro Leu Ser Glu Pro Val Leu Ile Ser Arg Pro Val Thr
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Ser Leu Ser Val Pro Ala Pro Val Pro Ala Pro Arg Arg Ala Val Ser
895 900 905

cga ccg atg acg ccc tcg agt gag cca att ttt gtg tct gca ctg cga 2966
Arg Pro Met Thr Pro Ser Ser Glu Pro Ile Phe Val Ser Ala Leu Arg
910 915 920 925

cac aaa ttt cag cag gtg gaa aaa gca aat ctg gcg gca gca gcg ccg 3014
His Lys Phe Gln Gln Val Glu Lys Ala Asn Leu Ala Ala Ala Ala Pro
930 935 940

atg tac cag gac gaa ccc tta gat ttg tct gca tcc tca cag act gaa 3062
Met Tyr Gln Asp Glu Pro Leu Asp Leu Ser Ala Ser Ser Gln Thr Glu
945 950 955

tat ggg gct tct ccc cta aca cca ccg cag aac gtg ggc att ctg gag 3110
Tyr Gly Ala Ser Pro Leu Thr Pro Pro Gln Asn Val Gly Ile Leu Glu
960 965 970

gta agg ggg caa gaa gct gag gaa gtt ctg agt gaa atc tcg gat att 3158
Val Arg Gly Gln Glu Ala Glu Glu Val Leu Ser Glu Ile Ser Asp Ile
975 980 985

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Leu Asn Asp Thr Asn Pro Ala Pro Val Ser Ser Ser Ser Ser Leu Ser
990 995 1000 1005

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Ser Val Arg Ile Thr Arg Pro Lys Tyr Ser Ala Gln Ala Ile Ile
1010 1015 1020

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gca tgc ctc cgc atc  atg cgt gag gct tgt  gat gcg gcc aag ctt       3341
Ala Cys Leu Arg Ile  Met Arg Glu Ala Cys  Asp Ala Ala Lys Leu
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agt gac cct gcc acg  cag gaa tgg ctt tct  cgc atg tgg gat agg       3386
Ser Asp Pro Ala Thr  Gln Glu Trp Leu Ser  Arg Met Trp Asp Arg
                1055                1060                1065

gtg gac atg ctg act  tgg cgc aac acg tct  gct tac cag gcg ttt       3431
Val Asp Met Leu Thr  Trp Arg Asn Thr Ser  Ala Tyr Gln Ala Phe
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cgc acc tta gat ggc  agg ttt ggg ttt ctc  cca aag atg ata ctc       3476
Arg Thr Leu Asp Gly  Arg Phe Gly Phe Leu  Pro Lys Met Ile Leu
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gag acg ccg ccg ccc  tac ccg tgt ggg ttt  gtg atg ttg cct cac       3521
Glu Thr Pro Pro Pro  Tyr Pro Cys Gly Phe  Val Met Leu Pro His
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acc cct gca cct tcc  gtg agt gca gag agc  gac ctt acc atc ggt       3566
Thr Pro Ala Pro Ser  Val Ser Ala Glu Ser  Asp Leu Thr Ile Gly
                1115                1120                1125

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Ser Val Ala Thr Glu  Asp Ile Pro Arg Ile  Leu Gly Lys Ile Glu
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aat acc ggt gag atg  atc aac cag gga ccc  ttg gca tcc tct gag       3656
Asn Thr Gly Glu Met  Ile Asn Gln Gly Pro  Leu Ala Ser Ser Glu
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gaa gaa ccg gta tac  aac caa cct gcc aaa  gac tcc cgg ata tcg       3701
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Gly Gly Ala Gly Leu  Phe Thr Asp Leu Pro  Pro Ser Asp Gly Val
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gat gcg gac ggt ggg  ggg ccg ttg cag acg  gta aga aag aaa gct      3836
Asp Ala Asp Gly Gly  Gly Pro Leu Gln Thr  Val Arg Lys Lys Ala
                1205                1210                1215

gaa agg ctc ttc gac  caa ttg agc cgt cag  gtt ttt aac ctc gtc      3881
Glu Arg Leu Phe Asp  Gln Leu Ser Arg Gln  Val Phe Asn Leu Val
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tcc cat ctc cct gtt  ttc ttc tca cac ctc  ttc aaa tct gac agt      3926
Ser His Leu Pro Val  Phe Phe Ser His Leu  Phe Lys Ser Asp Ser
                1235                1240                1245

ggt tat tct ccg ggt  gat tgg ggt ttt gca  gct ttt act cta ttt      3971
Gly Tyr Ser Pro Gly  Asp Trp Gly Phe Ala  Ala Phe Thr Leu Phe
                1250                1255                1260

tgc ctc ttt ttg tgt  tac agc tac cca ttc  ttc ggt ttc gtt ccc      4016
Cys Leu Phe Leu Cys  Tyr Ser Tyr Pro Phe  Phe Gly Phe Val Pro
                1265                1270                1275

ctc ttg ggt gta ttt  tct ggg tct tct cgg  cgt gtg cgc atg ggg      4061
Leu Leu Gly Val Phe  Ser Gly Ser Ser Arg  Arg Val Arg Met Gly
                1280                1285                1290

gtt ttt ggc tgc tgg  ctg gct ttt gct gtt  ggc ctg ttc aag cct      4106
Val Phe Gly Cys Trp  Leu Ala Phe Ala Val  Gly Leu Phe Lys Pro
                1295                1300                1305

gtg tcc gac cca gtc  ggc act gct tgt gag  ttt gac tcg cca gag      4151
Val Ser Asp Pro Val  Gly Thr Ala Cys Glu  Phe Asp Ser Pro Glu
                1310                1315                1320
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tgt agg aac gtc ctt  cat tct ttt gag ctt  ctc aaa cct tgg gac      4196
Cys Arg Asn Val Leu  His Ser Phe Glu Leu  Leu Lys Pro Trp Asp
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cct gtt cgc agc ctt  gtt gtg ggc ccc gtc  ggt ctc ggt ctt gcc      4241
Pro Val Arg Ser Leu  Val Val Gly Pro Val  Gly Leu Gly Leu Ala
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att ctt ggc agg tta  ctg ggc ggg gca cgc  tac atc tgg cat ttt      4286
Ile Leu Gly Arg Leu  Leu Gly Gly Ala Arg  Tyr Ile Trp His Phe
                1355                1360                1365

ttg ctt agg ctt ggc  att gtt gca gat tgt  atc ttg gct gga gct      4331
Leu Leu Arg Leu Gly  Ile Val Ala Asp Cys  Ile Leu Ala Gly Ala
                1370                1375                1380

tat gtg ctt tct caa  ggt agg tgt aaa aag  tgc tgg gga tct tgt      4376
Tyr Val Leu Ser Gln  Gly Arg Cys Lys Lys  Cys Trp Gly Ser Cys
                1385                1390                1395

ata aga act gct cct  aat gaa atc gcc ttc  aac gtg ttc cct ttt      4421
Ile Arg Thr Ala Pro  Asn Glu Ile Ala Phe  Asn Val Phe Pro Phe
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aca cgt gcg acc agg  tcg tca ctc atc gac  ctg tgc gat cgg ttt      4466
Thr Arg Ala Thr Arg  Ser Ser Leu Ile Asp  Leu Cys Asp Arg Phe
                1415                1420                1425

tgt gcg cca aaa ggc  atg gac ccc att ttc  ctc gcc act ggg tgg      4511
Cys Ala Pro Lys Gly  Met Asp Pro Ile Phe  Leu Ala Thr Gly Trp
                1430                1435                1440

cgt ggg tgc tgg acc  ggc cga agt ccc att  gag caa ccc tct gaa      4556
Arg Gly Cys Trp Thr  Gly Arg Ser Pro Ile  Glu Gln Pro Ser Glu
                1445                1450                1455

aaa ccc atc gcg ttc  gcc cag ttg gat gaa  aag agg att acg gct      4601
Lys Pro Ile Ala Phe  Ala Gln Leu Asp Glu  Lys Arg Ile Thr Ala
                1460                1465                1470
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aga act gtg gtc gct  cag cct tat gat cct  aat caa gcc gta aag      4646
Arg Thr Val Val Ala  Gln Pro Tyr Asp Pro  Asn Gln Ala Val Lys
                1475                1480                1485

tgc ttg cgg gtg tta  cag gcg ggt ggg gcg  atg gtg gcc gag gca      4691
Cys Leu Arg Val Leu  Gln Ala Gly Gly Ala  Met Val Ala Glu Ala
                1490                1495                1500

gtc cca aaa gtg gtc  aaa gtt tct gct att  cca ttc cga gcc ccc      4736
Val Pro Lys Val Val  Lys Val Ser Ala Ile  Pro Phe Arg Ala Pro
                1505                1510                1515

ttt ttt ccc acc gga  gtg aaa gtt gat ccc  gag tgc agg atc gtg      4781
Phe Phe Pro Thr Gly  Val Lys Val Asp Pro  Glu Cys Arg Ile Val
                1520                1525                1530

gtc gac ccc gat act  ttt act aca gcc ctc  cgg tct ggt tac tct      4826
Val Asp Pro Asp Thr  Phe Thr Thr Ala Leu  Arg Ser Gly Tyr Ser
                1535                1540                1545

acc aca aac ctc gtc  ctt ggt gtg ggg gac  ttt gcc cag ctg aat      4871
Thr Thr Asn Leu Val  Leu Gly Val Gly Asp  Phe Ala Gln Leu Asn
                1550                1555                1560

gga cta aag atc agg  caa att tcc aag cct  tcg gga gga ggc cca      4916
Gly Leu Lys Ile Arg  Gln Ile Ser Lys Pro  Ser Gly Gly Gly Pro
                1565                1570                1575

cac ctc att gct gcc  ctg cat gtt gcc tgc  tcg atg gcg ttg cac      4961
His Leu Ile Ala Ala  Leu His Val Ala Cys  Ser Met Ala Leu His
                1580                1585                1590

atg ctt gct ggg gtt  tat gta act tca gtg  ggg tct tgc ggt gcc      5006
Met Leu Ala Gly Val  Tyr Val Thr Ser Val  Gly Ser Cys Gly Ala
                1595                1600                1605

ggc acc aac gat cca  tgg tgc act aat ccg  ttt gcc gtt cct ggc      5051
Gly Thr Asn Asp Pro  Trp Cys Thr Asn Pro  Phe Ala Val Pro Gly
                1610                1615                1620
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tac gga cca ggc tct  ctc tgc acg tcc aga  ttg tgc atc tcc caa      5096
Tyr Gly Pro Gly Ser  Leu Cys Thr Ser Arg  Leu Cys Ile Ser Gln
                1625                1630                1635

cat ggc ctt acc ctg  ccc ttg aca gca ctt  gtg gcg gga ttc ggt      5141
His Gly Leu Thr Leu  Pro Leu Thr Ala Leu  Val Ala Gly Phe Gly
                1640                1645                1650

ctt cag gaa atc gcc  ttg gtc gtt ttg att  ttc gtt tcc atc gga      5186
Leu Gln Glu Ile Ala  Leu Val Val Leu Ile  Phe Val Ser Ile Gly
                1655                1660                1665

ggc atg gct cat agg  ttg agt tgt aag gct  gat atg ctg tgc atc      5231
Gly Met Ala His Arg  Leu Ser Cys Lys Ala  Asp Met Leu Cys Ile
                1670                1675                1680

tta ctt gca atc gcc  agc tat gtt tgg gta  ccc ctt acc tgg ttg      5276
Leu Leu Ala Ile Ala  Ser Tyr Val Trp Val  Pro Leu Thr Trp Leu
                1685                1690                1695

ctt tgt gtg ttt cct  tgt tgg ttg cgc tgg  ttc tct ttg cac ccc      5321
Leu Cys Val Phe Pro  Cys Trp Leu Arg Trp  Phe Ser Leu His Pro
                1700                1705                1710

ctc acc atc cta tgg  ttg gtg ttt ttc ttg  att tct gta aat atg      5366
Leu Thr Ile Leu Trp  Leu Val Phe Phe Leu  Ile Ser Val Asn Met
                1715                1720                1725

cct tcg gga atc ttg  gcc gtg gtg tta ttg  gtt tct ctt tgg ctt      5411
Pro Ser Gly Ile Leu  Ala Val Val Leu Leu  Val Ser Leu Trp Leu
                1730                1735                1740

ttg gga cgt tat act  aac att gct ggt ctt  gtc acc ccc tat gat      5456
Leu Gly Arg Tyr Thr  Asn Ile Ala Gly Leu  Val Thr Pro Tyr Asp
                1745                1750                1755

att cat cat tac acc  agt ggc ccc cgc ggt  gtt gcc gcc tta gct      5501
Ile His His Tyr Thr  Ser Gly Pro Arg Gly  Val Ala Ala Leu Ala
                1760                1765                1770
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acc gca cca gat gga  acc tac ttg gct gcc  gtc cgc cgc gct gcg       5546
Thr Ala Pro Asp Gly  Thr Tyr Leu Ala Ala  Val Arg Arg Ala Ala
                1775                1780                1785

ttg act ggt cgc acc  atg ctg ttc acc ccg  tct cag ctt ggg tcc       5591
Leu Thr Gly Arg Thr  Met Leu Phe Thr Pro  Ser Gln Leu Gly Ser
                1790                1795                1800

ctt ctt gag ggc gct  ttc aga act cga aag  ccc tca ctg aac acc       5636
Leu Leu Glu Gly Ala  Phe Arg Thr Arg Lys  Pro Ser Leu Asn Thr
                1805                1810                1815

gtc aat gtg gtt ggg  tcc tcc atg ggc tct  ggt gga gtg ttc acc       5681
Val Asn Val Val Gly  Ser Ser Met Gly Ser  Gly Gly Val Phe Thr
                1820                1825                1830

atc gac ggg aaa att  agg tgc gtg act gcc  gca cat gtc ctt acg       5726
Ile Asp Gly Lys Ile  Arg Cys Val Thr Ala  Ala His Val Leu Thr
                1835                1840                1845

ggt aat tcg gct agg  gtt tcc gga gtc ggc  ttc aat caa atg ctt       5771
Gly Asn Ser Ala Arg  Val Ser Gly Val Gly  Phe Asn Gln Met Leu
                1850                1855                1860

gac ttt gat gtg aaa  ggg gac ttc gcc ata  gct gat tgc ccg aat       5816
Asp Phe Asp Val Lys  Gly Asp Phe Ala Ile  Ala Asp Cys Pro Asn
                1865                1870                1875

tgg caa gga gct gct  ccc aag acc caa ttc  tgc gag gat gga tgg       5861
Trp Gln Gly Ala Ala  Pro Lys Thr Gln Phe  Cys Glu Asp Gly Trp
                1880                1885                1890

gct ggc cgt gcc tat  tgg ctg aca tcc tct  ggc gtc gaa ccc ggt       5906
Ala Gly Arg Ala Tyr  Trp Leu Thr Ser Ser  Gly Val Glu Pro Gly
                1895                1900                1905

gtt att ggg aat gga  ttc gcc ttc tgc ttc  acc gcg tgc ggc gat       5951
Val Ile Gly Asn Gly  Phe Ala Phe Cys Phe  Thr Ala Cys Gly Asp
                1910                1915                1920
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tcc ggg tcc cca gtg  atc acc gaa gct ggt  gag ctt gtc ggc gtt       5996
Ser Gly Ser Pro Val  Ile Thr Glu Ala Gly  Glu Leu Val Gly Val
                1925                 1930                 1935

cac aca gga tca aat  aaa caa gga ggt ggc  atc gtc acg cgc cct       6041
His Thr Gly Ser Asn  Lys Gln Gly Gly Gly  Ile Val Thr Arg Pro
                1940                 1945                 1950

tca ggc cag ttt tgt  aac gtg gca ccc atc  aag ctg agc gaa tta       6086
Ser Gly Gln Phe Cys  Asn Val Ala Pro Ile  Lys Leu Ser Glu Leu
                1955                 1960                 1965

agt gaa ttc ttt gct  gga ccc aag gtc ccg  ctc ggt gat gtg aag       6131
Ser Glu Phe Phe Ala  Gly Pro Lys Val Pro  Leu Gly Asp Val Lys
                1970                 1975                 1980

gtt ggc agc cac ata  att aaa gat acg tgc  gaa gta cct tca gat       6176
Val Gly Ser His Ile  Ile Lys Asp Thr Cys  Glu Val Pro Ser Asp
                1985                 1990                 1995

ctt tgc gcc ttg ctt  gct gcc aaa cct gaa  ctg gag gga ggc ctc       6221
Leu Cys Ala Leu Leu  Ala Ala Lys Pro Glu  Leu Glu Gly Gly Leu
                2000                 2005                 2010

tcc acc gtc caa ctt  ctg tgt gtg ttt ttc  cta ctg tgg aga atg       6266
Ser Thr Val Gln Leu  Leu Cys Val Phe Phe  Leu Leu Trp Arg Met
                2015                 2020                 2025

atg gga cat gcc tgg  acg ccc ttg gtt gct  gtg ggg ttt ttc att       6311
Met Gly His Ala Trp  Thr Pro Leu Val Ala  Val Gly Phe Phe Ile
                2030                 2035                 2040

ctg aat gag gtt ctc  cca gct gtc ctg gtt  cgg agt gtt ttc tcc       6356
Leu Asn Glu Val Leu  Pro Ala Val Leu Val  Arg Ser Val Phe Ser
                2045                 2050                 2055

ttt ggg atg ttt gtg  cta tct tgg ctc aca  cca tgg tct gcg caa       6401
Phe Gly Met Phe Val  Leu Ser Trp Leu Thr  Pro Trp Ser Ala Gln
                2060                 2065                 2070
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gtt ctg atg atc agg  ctt cta aca gca gct  ctt aac agg aac aga      6446
Val Leu Met Ile Arg  Leu Leu Thr Ala Ala  Leu Asn Arg Asn Arg
                2075                2080                2085

tgg tca ctt gcc ttt  tac agc ctt ggt gcg  gtg acc ggt ttt gtc      6491
Trp Ser Leu Ala Phe  Tyr Ser Leu Gly Ala  Val Thr Gly Phe Val
                2090                2095                2100

gca gat ctt gcg gca  act caa ggg cac ccg  ttg cag gca gta atg      6536
Ala Asp Leu Ala Ala  Thr Gln Gly His Pro  Leu Gln Ala Val Met
                2105                2110                2115

aat ttg agc acc tat  gcc ttc ctg cct cgg  atg atg gtt gtg acc      6581
Asn Leu Ser Thr Tyr  Ala Phe Leu Pro Arg  Met Met Val Val Thr
                2120                2125                2130

tca cca gtc cca gtg  att gcg tgt ggt gtt  gtg cac cta ctt gcc      6626
Ser Pro Val Pro Val  Ile Ala Cys Gly Val  Val His Leu Leu Ala
                2135                2140                2145

atc att ttg tac ttg  ttc aag tac cgc ggc  ctg cac aat gtt ctt      6671
Ile Ile Leu Tyr Leu  Phe Lys Tyr Arg Gly  Leu His Asn Val Leu
                2150                2155                2160

gtt ggt gat gga gcg  ttt tct gca gct ttc  ttc ttg cga tac ttt      6716
Val Gly Asp Gly Ala  Phe Ser Ala Ala Phe  Phe Leu Arg Tyr Phe
                2165                2170                2175

gcc gag gga aag ttg  agg gaa ggg gtg tcg  caa tcc tgc gga atg      6761
Ala Glu Gly Lys Leu  Arg Glu Gly Val Ser  Gln Ser Cys Gly Met
                2180                2185                2190

aat cat gag tca tta  act ggt gcc ctc gct  atg aga ctc aat gac      6806
Asn His Glu Ser Leu  Thr Gly Ala Leu Ala  Met Arg Leu Asn Asp
                2195                2200                2205

gag gac ttg gac ttc  ctt acg aaa tgg act  gat ttt aag tgc ttt      6851
Glu Asp Leu Asp Phe  Leu Thr Lys Trp Thr  Asp Phe Lys Cys Phe
                2210                2215                2220
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gtt tct gcg tcc aac  atg agg aat gca gca  ggc caa ttc atc gag      6896
Val Ser Ala Ser Asn  Met Arg Asn Ala Ala  Gly Gln Phe Ile Glu
                2225                2230                2235

gct gcc tat gca aaa  gca ctt aga att gaa  ctt gcc cag ttg gtg      6941
Ala Ala Tyr Ala Lys  Ala Leu Arg Ile Glu  Leu Ala Gln Leu Val
                2240                2245                2250

cag gtt gat aag gtt  cga ggt act ttg gcc  aag ctt gag gct ttt      6986
Gln Val Asp Lys Val  Arg Gly Thr Leu Ala  Lys Leu Glu Ala Phe
                2255                2260                2265

gct gat acc gtg gca  ccc caa ctc tcg ccc  ggt gac att gtt gtt      7031
Ala Asp Thr Val Ala  Pro Gln Leu Ser Pro  Gly Asp Ile Val Val
                2270                2275                2280

gct ctt ggc cat acg  cct gtt ggc agc atc  ttc gac cta aag gtt      7076
Ala Leu Gly His Thr  Pro Val Gly Ser Ile  Phe Asp Leu Lys Val
                2285                2290                2295

ggt ggt acc aag cat  act ctc caa gtc att  gag acc aga gtc ctt      7121
Gly Gly Thr Lys His  Thr Leu Gln Val Ile  Glu Thr Arg Val Leu
                2300                2305                2310

gcc ggg tcc aaa atg  acc gtg gcg cgc gtc  gtt gac cca acc ccc      7166
Ala Gly Ser Lys Met  Thr Val Ala Arg Val  Val Asp Pro Thr Pro
                2315                2320                2325

acg ccc cca ccc gca  ccc gtg ccc atc ccc  ctc cca ccg aaa gtt      7211
Thr Pro Pro Pro Ala  Pro Val Pro Ile Pro  Leu Pro Pro Lys Val
                2330                2335                2340

cta gag aat ggt ccc  aac gcc tgg ggg gat  ggg gac cgt ttg aat      7256
Leu Glu Asn Gly Pro  Asn Ala Trp Gly Asp  Gly Asp Arg Leu Asn
                2345                2350                2355

aag aag aag agg cgt  agg atg gaa acc gtc  ggc atc ttt gtc atg      7301
Lys Lys Lys Arg Arg  Arg Met Glu Thr Val  Gly Ile Phe Val Met
                2360                2365                2370
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ggt ggg aag aag tac  cag aaa ttt tgg gac  aag aat tcc ggt gat       7346
Gly Gly Lys Lys Tyr  Gln Lys Phe Trp Asp  Lys Asn Ser Gly Asp
                2375                2380                2385

gtg ttt tac gag gag  gtc cat gac aac aca  gat gcg tgg gag tgc       7391
Val Phe Tyr Glu Glu  Val His Asp Asn Thr  Asp Ala Trp Glu Cys
                2390                2395                2400

ctc aga gtt ggt gac  cct gcc gac ttt gac  cct gag aag gga act       7436
Leu Arg Val Gly Asp  Pro Ala Asp Phe Asp  Pro Glu Lys Gly Thr
                2405                2410                2415

ctg tgt ggg cat act  act att gaa gat aag  gat tac aaa gtc tac       7481
Leu Cys Gly His Thr  Thr Ile Glu Asp Lys  Asp Tyr Lys Val Tyr
                2420                2425                2430

gcc tcc cca tct ggc  aag aag ttc ctg gtc  ccc gtc aac tca gag       7526
Ala Ser Pro Ser Gly  Lys Lys Phe Leu Val  Pro Val Asn Ser Glu
                2435                2440                2445

agc gga aga gcc caa  tgg gaa gct gca aag  ctt tcc gtg gag cag       7571
Ser Gly Arg Ala Gln  Trp Glu Ala Ala Lys  Leu Ser Val Glu Gln
                2450                2455                2460

gcc ctt ggc atg atg  aat gtc gac ggt gaa  ctg acg gcc aaa gaa       7616
Ala Leu Gly Met Met  Asn Val Asp Gly Glu  Leu Thr Ala Lys Glu
                2465                2470                2475

gtg gag aaa ctg aaa  aga ata att gac aaa  ctt cag ggc ctg act       7661
Val Glu Lys Leu Lys  Arg Ile Ile Asp Lys  Leu Gln Gly Leu Thr
                2480                2485                2490

aag gag cag tgt tta  aac tgc tag ccgccagcgg cttgacccgc tgtggtcgcg   7715
Lys Glu Gln Cys Leu  Asn Cys
                2495

gcggcttggt tgttactgag acagcggtaa aaatagtcaa atttcacaac cggactttca   7775

ccctagggcc tgtgaattta aaagtggcca gtgaggttga gctgaaagac gcggtcgagc   7835
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acaaccaaca cccggttgca agaccggttg acggtggtgt tgtgctcctg cgttccgcag 7895

ttccttcgct tatagatgtc ctgatctccg gtgctgacgc atctcctaag ttactcgctc 7955

gtcacgggcc ggggaacact gggatcgatg gcacgctttg ggactttgag gccgaggcca 8015

ccaaagagga aattgcactc agtgcgcaaa taatacaggc ttgtgacatt aggcgcggcg 8075

acgcacctga aattggtctc ccttacaagc tgtaccctgt taggggcaac cctgagcggg 8135

taaaaggagt tttacagaat acaaggtttg gagacatacc ttacaaaacc cccagtgaca 8195

ctggaagccc agtgcacgcg gctgcctgcc tcacgcccaa tgccactccg gtgactgatg 8255

ggcgctctgt cttggctact accatgccct ccggttttga attgtatgta ccgaccattc 8315

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gcccgcccgt tcatcggcct tccacttacc ctgccaagaa ttctatggct ggaataaatg 8555

ggaacaggtt tccaaccaag gacattcaga gcgtccctga aatcgacgtt ctgtgcgcac 8615

aggccgtgcg agaaaactgg caaactgtta ccccttgtac cctcaagaaa cagtattgtg 8675

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accatatgaa ggcaagcaat gtttctgaat actacgccgc ggcggctgca atactcatgg 9455

acagctgtgc ttgtttagag tatgatcctg aatggtttga agagcttgtg gttgggatag 9515

cgcagtgcgc ccgcaaggac ggctacagct ttcccggccc gccgttcttc ttgtccatgt 9575

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aactccaccc agtgggtttt gattctcatt gctatgtttt tgacatcatg cctcagaccc 10415

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ccgcaaaagc agtgtgcaca ttgacggatg tgtacctccc agaccttgag gcctacctcc  11495

acccagagac tcagtctaag tgctggaaag ttatgttgga cttcaaggaa gttcgactga  11555

tggtctggaa agacaagacg gcctatttcc aacttgaagg ccgctatttc acctggtatc  11615

agcttgcaag ctacgcctcg tacatccgtg ttcctgtcaa ctccacggtg tatctggacc  11675

cctgcatggg ccctgccctt tgcaacagaa gagttgtcgg gtccacccat tggggagctg  11735

acctcgcagt caccccttat gattacggtg ctaaaatcat cttgtctagc gcttaccatg  11795

gtgaaatgcc tcctggatac aagattctgg cgtgcgcgga gttctcgctc gacgacccag  11855

tcaagtacaa acacacctgg ggttttgaat cggatacagc gtatctgtat gagttcaccg  11915

gaaacggtga ggactgggag gattacaatg atgcgtttcg tgcgcgccag aaagggaaaa  11975

tttataaggc cactgctacc agcatgaagt tttattttcc cccgggcccc gtcattgaac  12035

caactttagg cctgaattga a atg aaa tgg  ggt cta tac aaa gcc  tct tcg  12086
                      Met Lys Trp  Gly Leu Tyr Lys Ala  Ser Ser
                                2500                2505

aca aaa ttg  gcc agc ttt ttg tgg  atg ctt tca cgg aat  ttt tgg     12131
Thr Lys Leu  Ala Ser Phe Leu Trp  Met Leu Ser Arg Asn  Phe Trp
        2510                2515                2520

tgt cca ttg  ttg ata tca tca tat  ttt tgg cca ttt tgt  ttg gct     12176
Cys Pro Leu  Leu Ile Ser Ser Tyr  Phe Trp Pro Phe Cys  Leu Ala
        2525                2530                2535

tca cca tcg  ccg gtt ggc tgg tgg  tct ttt gca tca gat  tgg ttt     12221
Ser Pro Ser  Pro Val Gly Trp Trp  Ser Phe Ala Ser Asp  Trp Phe
        2540                2545                2550

gct ccg cgg  tat tcc gtg cgc gcc  ctg cca ttc acc ctg  agc aat     12266
Ala Pro Arg  Tyr Ser Val Arg Ala  Leu Pro Phe Thr Leu  Ser Asn
        2555                2560                2565
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tac aga aga  tcc tat gag gcc ttt  ctt tct cag tgc cgg  gtg gac     12311
Tyr Arg Arg  Ser Tyr Glu Ala Phe  Leu Ser Gln Cys Arg  Val Asp
        2570                 2575                 2580

att ccc acc  tgg ggg gta aaa cac  cct ttg ggg atg ttt  tgg cac     12356
Ile Pro Thr  Trp Gly Val Lys His  Pro Leu Gly Met Phe  Trp His
        2585                 2590                 2595

cat aag gtg  tca acc ctg att gat  gaa atg gtg tcg cgt  cga atg     12401
His Lys Val  Ser Thr Leu Ile Asp  Glu Met Val Ser Arg  Arg Met
        2600                 2605                 2610

tac cgc atc  atg gaa aaa gca ggg  caa gct gcc tgg aaa  cag gtg     12446
Tyr Arg Ile  Met Glu Lys Ala Gly  Gln Ala Ala Trp Lys  Gln Val
        2615                 2620                 2625

gtg agc gag  gct acg ctg tct cgc  att agt agt ttg gat  gtg gtg     12491
Val Ser Glu  Ala Thr Leu Ser Arg  Ile Ser Ser Leu Asp  Val Val
        2630                 2635                 2640

gct cat ttt  caa cat ctt gcc gcc  att gaa gcc gag acc  tgt aaa     12536
Ala His Phe  Gln His Leu Ala Ala  Ile Glu Ala Glu Thr  Cys Lys
        2645                 2650                 2655

tat ttg gct  tct cga ctg ccc atg  cta cac aac ctg cgc  atg aca     12581
Tyr Leu Ala  Ser Arg Leu Pro Met  Leu His Asn Leu Arg  Met Thr
        2660                 2665                 2670

ggg tca aat  gta acc ata gtg tat  aat agc act tta aat  cag gtg     12626
Gly Ser Asn  Val Thr Ile Val Tyr  Asn Ser Thr Leu Asn  Gln Val
        2675                 2680                 2685

ttt gct att  ttt cca acc cct ggt  tcc cgg cca aag ctt  cat gat     12671
Phe Ala Ile  Phe Pro Thr Pro Gly  Ser Arg Pro Lys Leu  His Asp
        2690                 2695                 2700

ttt cag caa  tgg cta ata gct gta  cat tcc tcc ata ttt  tcc tct     12716
Phe Gln Gln  Trp Leu Ile Ala Val  His Ser Ser Ile Phe  Ser Ser
        2705                 2710                 2715
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gtt gca gct  tct tgt act ctt ttt  gtt gtg ctg tgg ttg  cgg gtt     12761
Val Ala Ala  Ser Cys Thr Leu Phe  Val Val Leu Trp Leu  Arg Val
        2720                 2725                 2730

cca atg cta  cgt act gtt ttt ggt  ttc cgc tgg tta ggg  gca att     12806
Pro Met Leu  Arg Thr Val Phe Gly  Phe Arg Trp Leu Gly  Ala Ile
        2735                 2740                 2745

ttt ctt tcg  aac tca tgg tga attacacggt gtgtccacct tgcctcaccc     12857
Phe Leu Ser  Asn Ser Trp
        2750

gacaagcagc cgctgaggtc cttgaacccg gtaggtctct ttggtgcagg atagggcatg  12917

accgatgtgg ggaggacgat cacgacgaac tagggttcat ggttccgcct ggcctctcca  12977

gcgaaagcca cttgaccagt gtttacgcct ggttggcgtt cctgtccttc agctacacgg  13037

cccagttcca tcccgagata tttgggatag ggaacgtgag tgaagtttat gttgacatca  13097

agcaccaatt catctgcgcc gttcatgacg ggcagaacac caccttgcct cgccatgaca  13157

atatttcagc cgtatttcag acctactatc aacatcaggt cgacggcggc aattggtttc  13217

acctaga atg gct  gcg tcc ctt ctt ttc  ctc ttg gtt ggt ttt  aaa     13263
        Met Ala  Ala Ser Leu Leu Phe  Leu Leu Val Gly Phe  Lys
            2755                 2760                 2765

tgt ttc gtg gtt  tct cag gcg ttc gcc  tgc aag cca tgt ttc  agt     13308
Cys Phe Val Val  Ser Gln Ala Phe Ala  Cys Lys Pro Cys Phe  Ser
            2770                 2775                 2780

tcg agt ctt tca  gac atc aaa acc aac  act acc gca gca tca  ggc     13353
Ser Ser Leu Ser  Asp Ile Lys Thr Asn  Thr Thr Ala Ala Ser  Gly
            2785                 2790                 2795

ttt gtt gtc ctc  cag gac atc agc tgc  ctt agg cat ggc gac  tcg     13398
Phe Val Val Leu  Gln Asp Ile Ser Cys  Leu Arg His Gly Asp  Ser
            2800                 2805                 2810
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tcc ttt ccg acg att cgc aaa agc tct caa tgc cgc acg gcg ata 13443
Ser Phe Pro Thr Ile Arg Lys Ser Ser Gln Cys Arg Thr Ala Ile
2815 2820 2825

ggg aca ccc gtg tat atc acc atc aca gcc aat gtg aca gat gag 13488
Gly Thr Pro Val Tyr Ile Thr Ile Thr Ala Asn Val Thr Asp Glu
2830 2835 2840

aat tac tta cat tct tct gat ctc ctc atg ctt tct tct tgc ctt 13533
Asn Tyr Leu His Ser Ser Asp Leu Leu Met Leu Ser Ser Cys Leu
2845 2850 2855

ttc tat gct tct gag atg agt gaa aag gga ttc aag gtg gtg ttt 13578
Phe Tyr Ala Ser Glu Met Ser Glu Lys Gly Phe Lys Val Val Phe
2860 2865 2870

ggc aat gtg tca ggc atc gtg gct gtg tgt gtc aac ttt acc agc 13623
Gly Asn Val Ser Gly Ile Val Ala Val Cys Val Asn Phe Thr Ser
2875 2880 2885

tac gtc caa cat gtc aaa gag ttt acc caa cgc tcc ttg gtg gtc 13668
Tyr Val Gln His Val Lys Glu Phe Thr Gln Arg Ser Leu Val Val
2890 2895 2900

gat cat gtg cgg ctg ctt cat ttc atg aca cct gag acc atg agg 13713
Asp His Val Arg Leu Leu His Phe Met Thr Pro Glu Thr Met Arg
2905 2910 2915

tgg gca acc gtt tta gcc tgt ctt ttt gcc atc cta ctg gca att 13758
Trp Ala Thr Val Leu Ala Cys Leu Phe Ala Ile Leu Leu Ala Ile
2920 2925 2930

tga atgttcaagt atg ttg ggg aaa tgc ttg acc gcg ggc tgt tgc tcg 13807
Met Leu Gly Lys Cys Leu Thr Ala Gly Cys Cys Ser
2935 2940

cga ttg ctt tct ttg tgg tgt atc gtg ccg ttc tgt ttt gct gtg 13852
Arg Leu Leu Ser Leu Trp Cys Ile Val Pro Phe Cys Phe Ala Val
2945 2950 2955

```
ctc ggc  agc gcc aac agc agc  agc agc tct cat ttt  cag ttg att     13897
Leu Gly  Ser Ala Asn Ser Ser  Ser Ser Ser His Phe  Gln Leu Ile
    2960                 2965                 2970

tat aac  ttg acg cta tgt gag  ctg aat ggc aca gat  tgg ctg gca     13942
Tyr Asn  Leu Thr Leu Cys Glu  Leu Asn Gly Thr Asp  Trp Leu Ala
    2975                 2980                 2985

gaa aaa  ttt gat tgg gca gtg  gag act ttt gtc atc  ttt ccc gtg     13987
Glu Lys  Phe Asp Trp Ala Val  Glu Thr Phe Val Ile  Phe Pro Val
    2990                 2995                 3000

ttg act  cac att gtt tcc tat  ggt gca ctc acc acc  agc cat ttc     14032
Leu Thr  His Ile Val Ser Tyr  Gly Ala Leu Thr Thr  Ser His Phe
    3005                 3010                 3015

ctt gac  aca gtt ggt ctg gtt  act gtg tcc acc gcc  ggg ttt tat     14077
Leu Asp  Thr Val Gly Leu Val  Thr Val Ser Thr Ala  Gly Phe Tyr
    3020                 3025                 3030

cac ggg  cgg tat gtc ttg agt  agc atc tac gcg gtc  tgt gct ctg     14122
His Gly  Arg Tyr Val Leu Ser  Ser Ile Tyr Ala Val  Cys Ala Leu
    3035                 3040                 3045

gct gcg  ttg att tgc ttc gtt  att agg ctt gcg aag  aac tgc atg     14167
Ala Ala  Leu Ile Cys Phe Val  Ile Arg Leu Ala Lys  Asn Cys Met
    3050                 3055                 3060

tcc tgg  cgc tac tct tgt acc  aga tat acc aac ttc  ctt ctg gac     14212
Ser Trp  Arg Tyr Ser Cys Thr  Arg Tyr Thr Asn Phe  Leu Leu Asp
    3065                 3070                 3075

act aag  ggc aga ctc tat cgt  tgg cgg tcg ccc gtt  atc ata gaa     14257
Thr Lys  Gly Arg Leu Tyr Arg  Trp Arg Ser Pro Val  Ile Ile Glu
    3080                 3085                 3090

aaa ggg  ggt aag gtt gag gtc  gaa ggt cac ctg atc  gac ctc aaa     14302
Lys Gly  Gly Lys Val Glu Val  Glu Gly His Leu Ile  Asp Leu Lys
    3095                 3100                 3105
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aga gtt  gtg ctt gat ggt tcc  gtg gca acc cct tta  acc aga gtt     14347
Arg Val  Val Leu Asp Gly Ser  Val Ala Thr Pro Leu  Thr Arg Val
    3110                 3115                 3120

tca gcg  gaa caa tgg ggt cgt  ctc tag acgacttttg ccatgatagc       14394
Ser Ala  Glu Gln Trp Gly Arg  Leu
    3125                 3130

acggctccac aaaaggtgct tttggcgttt tccattacct acacgccagt aatgatatat  14454

gctctaaagg taagtcgcgg ccgactacta gggcttctgc acctttttgat ctttctgaat  14514

tgtgctttta ccttcgggta catgacattc gagcactttc agagcacaaa tagggtcgcg  14574

ctcactatgg gagcagtagt tgcacttctt tgggggggtgt actcagccat agaaacctgg  14634

aaattcatca cctccagatg ccgtttgtgc ttgctaggcc gcaagtacat tctggcccct  14694

gcccaccacg tcgaaagtgc cgcgggcttt catccgattg cggcaaatga taaccacgca  14754

tttgtcgtcc ggcgtcccgg ctccactacg gttaacggca cattggtgcc cgggttgaaa  14814

agcctcgtgt tgggtggcag aaaagctgtt aaacagggag tggtaaacct tgtcaaat    14872

atg cca aat aac  aac ggc aag cag caa  aag aaa aag aag ggg  aat     14917
Met Pro Asn Asn  Asn Gly Lys Gln Gln  Lys Lys Lys Lys Gly  Asn
            3135                 3140                 3145

ggc cag cca gtc  aat cag ctg tgc cag  atg ctg ggt aaa atc  atc     14962
Gly Gln Pro Val  Asn Gln Leu Cys Gln  Met Leu Gly Lys Ile  Ile
            3150                 3155                 3160

gcc cag caa aac  cag tcc aga ggc aag  gga ccg ggc aag aaa  agt     15007
Ala Gln Gln Asn  Gln Ser Arg Gly Lys  Gly Pro Gly Lys Lys  Ser
            3165                 3170                 3175

aag aag aaa aac  ccg gag aag ccc cat  ttt cct cta gcg acc  gaa     15052
Lys Lys Lys Asn  Pro Glu Lys Pro His  Phe Pro Leu Ala Thr  Glu
            3180                 3185                 3190
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gat gac gtc agg cat cac ttc acc cct ggt gag cgg caa ttg tgt 15097
Asp Asp Val Arg His His Phe Thr Pro Gly Glu Arg Gln Leu Cys
3195 3200 3205

ctg tcg tcg atc cag act gcc ttt aac cag ggc gct gga act tgt 15142
Leu Ser Ser Ile Gln Thr Ala Phe Asn Gln Gly Ala Gly Thr Cys
3210 3215 3220

acc ctg tca gat tca ggg agg ata agt tac act gtg gag ttt agt 15187
Thr Leu Ser Asp Ser Gly Arg Ile Ser Tyr Thr Val Glu Phe Ser
3225 3230 3235

ttg ccg acg cat cat act gtg cgc ctg atc cgc gtc aca gca tca 15232
Leu Pro Thr His His Thr Val Arg Leu Ile Arg Val Thr Ala Ser
3240 3245 3250

ccc tca gca tga tgggctggca ttctttaggc acctcagtgt cagaattgga 15284
Pro Ser Ala

agaatgtgtg gtggatggca ctgattgaca ttgtgcctct aagtcaccta ttcaattagg 15344

gcgaccgtgt gggggtaaaa tttaattggc gagaaccatg cggccgcaat taaaaaaaaa 15404

aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaa 15450

<210> 25
<211> 2497
<212> PRT
<213> Arterivirus porcine respiratory and reproductive syndrome virus

<400> 25

Met Ser Gly Ile Leu Asp Arg Cys Thr Cys Thr Pro Asn Ala Arg Val
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Phe Met Ala Glu Gly Gln Val Tyr Cys Thr Arg Cys Leu Ser Ala Arg
20 25 30

Ser Leu Leu Pro Leu Asn Leu Gln Val Pro Glu Leu Gly Val Leu Gly
35 40 45

Leu Phe Tyr Arg Pro Glu Glu Pro Leu Arg Trp Thr Leu Pro Arg Ala
50 55 60

Phe Pro Thr Val Glu Cys Ser Pro Ala Gly Ala Cys Trp Leu Ser Ala
65 70 75 80

Ile Phe Pro Ile Ala Arg Met Thr Ser Gly Asn Leu Asn Phe Gln Gln
85 90 95

Arg Met Val Arg Val Ala Ala Glu Ile Tyr Arg Ala Gly Gln Leu Thr
100 105 110

Pro Ala Val Leu Lys Ala Leu Gln Val Tyr Glu Arg Gly Cys Arg Trp
115 120 125

Tyr Pro Ile Val Gly Pro Val Pro Gly Val Ala Val His Ala Asn Ser
130 135 140

Leu His Val Ser Asp Lys Pro Phe Pro Gly Ala Thr His Val Leu Thr
145 150 155 160

Asn Leu Pro Leu Pro Gln Arg Pro Lys Pro Glu Asp Phe Cys Pro Phe
165 170 175

Glu Cys Ala Met Ala Asp Val Tyr Asp Ile Ser His Asp Ala Val Met
180 185 190

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Tyr Val Ala Arg Gly Lys Val Ser Trp Ala Pro Arg Gly Gly Asp Glu
        195                 200                 205

Val Lys Phe Glu Thr Val Pro Glu Glu Leu Lys Leu Ile Ala Asn Arg
    210                 215                 220

Leu His Ile Ser Phe Pro Pro His His Ala Val Asp Met Ser Glu Phe
225                 230                 235                 240

Ala Phe Ile Ala Pro Gly Ser Gly Val Ser Leu Arg Val Glu His Gln
                245                 250                 255

His Gly Cys Leu Pro Ala Asp Thr Val Pro Glu Gly Asn Cys Trp Trp
            260                 265                 270

Cys Leu Phe Asp Leu Leu Pro Pro Glu Val Gln Asn Lys Glu Ile Arg
        275                 280                 285

Arg Ala Asn Gln Phe Gly Tyr Gln Thr Lys His Gly Val Pro Gly Lys
    290                 295                 300

Tyr Leu Gln Arg Arg Leu Gln Val Asn Gly Leu Arg Ala Val Thr Asp
305                 310                 315                 320

Thr Asp Gly Pro Ile Val Val Gln Tyr Phe Ser Val Arg Glu Ser Trp
                325                 330                 335

Ile Arg His Phe Arg Leu Ala Glu Glu Pro Ser Leu Pro Gly Phe Glu
            340                 345                 350
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Asp Leu Leu Arg Ile Arg Val Glu Pro Asn Thr Ser Pro Leu Gly Gly
        355                 360                 365

Lys Gly Glu Lys Ile Phe Arg Phe Gly Ser His Lys Trp Tyr Gly Ala
    370                 375                 380

Gly Lys Arg Ala Arg Arg Ala Arg Ser Gly Ala Thr Ala Thr Val Ala
385                 390                 395                 400

His Cys Ala Leu Pro Ala Arg Glu Ala Gln Gln Ala Lys Lys Leu Glu
                405                 410                 415

Val Ala Ser Ala Asn Arg Ala Glu His Leu Lys Tyr Tyr Ser Pro Pro
            420                 425                 430

Ala Asp Gly Asn Cys Gly Trp His Cys Ile Ser Ala Ile Thr Asn Arg
        435                 440                 445

Met Val Asn Ser Lys Phe Glu Thr Thr Leu Pro Glu Arg Val Arg Pro
    450                 455                 460

Ser Asp Asp Trp Ala Thr Asp Glu Asp Leu Val Asn Thr Ile Gln Ile
465                 470                 475                 480

Leu Arg Leu Pro Ala Ala Leu Asp Arg Asn Gly Ala Cys Ala Gly Ala
                485                 490                 495

Lys Tyr Val Leu Lys Leu Glu Gly Glu His Trp Thr Val Ser Val Thr
            500                 505                 510
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Pro Gly Met Thr Pro Ser Leu Leu Pro Leu Glu Cys Val Gln Gly Cys
515 520 525

Cys Glu His Lys Ser Gly Leu Gly Phe Pro Asp Val Val Glu Val Ser
530 535 540

Gly Phe Asp Pro Ala Cys Leu Asp Arg Leu Ala Glu Ile Met His Leu
545 550 555 560

Pro Ser Ser Val Ile Pro Ala Ala Leu Ala Glu Met Ser Asp Asp Phe
565 570 575

Asn Arg Leu Ala Ser Pro Ala Ala Thr Val Trp Thr Val Ser Gln Phe
580 585 590

Phe Ala Arg His Arg Gly Gly Glu His Pro Asp Gln Val Cys Leu Gly
595 600 605

Lys Ile Ile Asn Leu Cys Gln Val Ile Glu Glu Cys Cys Cys Ser Arg
610 615 620

Asn Lys Ala Asn Arg Ala Thr Pro Glu Glu Val Ala Ala Lys Val Asp
625 630 635 640

Gln Tyr Leu Arg Gly Ala Ala Ser Leu Gly Glu Cys Leu Ala Lys Leu
645 650 655

Glu Arg Ala Arg Pro Pro Ser Ala Met Asp Thr Ser Phe Asp Trp Asn
660 665 670

Val Val Leu Pro Gly Val Glu Thr Ala Asp Gln Thr Thr Lys Gln Leu
675 680 685

His Val Asn Gln Cys Arg Ala Leu Val Pro Val Val Thr Gln Glu Pro
690 695 700

Leu Asp Arg Asp Ser Val Pro Leu Thr Ala Phe Ser Leu Ser Asn Cys
705 710 715 720

Tyr Tyr Pro Ala Gln Gly Asp Glu Val Arg His Arg Glu Arg Leu Asn
725 730 735

Ser Val Leu Ser Lys Leu Glu Gly Val Val Arg Glu Glu Tyr Gly Leu
740 745 750

Thr Pro Thr Gly Pro Gly Pro Arg Pro Ala Leu Pro Asn Gly Leu Asp
755 760 765

Glu Leu Lys Asp Gln Met Glu Glu Asp Leu Leu Lys Leu Val Asn Ala
770 775 780

Gln Ala Thr Ser Glu Met Met Ala Trp Ala Ala Glu Gln Val Asp Leu
785 790 795 800

Lys Ala Trp Val Lys Asn Tyr Pro Arg Trp Thr Pro Pro Pro Pro Pro
805 810 815

Pro Arg Val Gln Pro Arg Lys Thr Lys Ser Val Lys Ser Leu Leu Glu
820 825 830

Asn Lys Pro Val Pro Ala Pro Arg Arg Lys Val Arg Ser Asp Tyr Gly
835 840 845

Ser Pro Ile Leu Met Gly Asp Asn Val Pro Asn Gly Trp Glu Asp Ser
850 855 860

Thr Val Gly Gly Pro Leu Asp Leu Ser Ala Pro Ser Glu Pro Met Thr
865 870 875 880

Pro Leu Ser Glu Pro Val Leu Ile Ser Arg Pro Val Thr Ser Leu Ser
885 890 895

Val Pro Ala Pro Val Pro Ala Pro Arg Arg Ala Val Ser Arg Pro Met
900 905 910

Thr Pro Ser Ser Glu Pro Ile Phe Val Ser Ala Leu Arg His Lys Phe
915 920 925

Gln Gln Val Glu Lys Ala Asn Leu Ala Ala Ala Ala Pro Met Tyr Gln
930 935 940

Asp Glu Pro Leu Asp Leu Ser Ala Ser Ser Gln Thr Glu Tyr Gly Ala
945 950 955 960

Ser Pro Leu Thr Pro Pro Gln Asn Val Gly Ile Leu Glu Val Arg Gly
965 970 975

Gln Glu Ala Glu Glu Val Leu Ser Glu Ile Ser Asp Ile Leu Asn Asp
980 985 990

Thr Asn Pro Ala Pro Val Ser Ser Ser Ser Ser Leu Ser Ser Val Arg
995 1000 1005

Ile Thr Arg Pro Lys Tyr Ser Ala Gln Ala Ile Ile Asp Leu Gly
1010 1015 1020

Gly Pro Cys Ser Gly His Leu Gln Arg Glu Lys Glu Ala Cys Leu
1025 1030 1035

Arg Ile Met Arg Glu Ala Cys Asp Ala Ala Lys Leu Ser Asp Pro
1040 1045 1050

Ala Thr Gln Glu Trp Leu Ser Arg Met Trp Asp Arg Val Asp Met
1055 1060 1065

Leu Thr Trp Arg Asn Thr Ser Ala Tyr Gln Ala Phe Arg Thr Leu
1070 1075 1080

Asp Gly Arg Phe Gly Phe Leu Pro Lys Met Ile Leu Glu Thr Pro
1085 1090 1095

Pro Pro Tyr Pro Cys Gly Phe Val Met Leu Pro His Thr Pro Ala
1100 1105 1110

Pro Ser Val Ser Ala Glu Ser Asp Leu Thr Ile Gly Ser Val Ala
1115 1120 1125

Thr Glu Asp Ile Pro Arg Ile Leu Gly Lys Ile Glu Asn Thr Gly
1130 1135 1140

Glu Met Ile Asn Gln Gly Pro Leu Ala Ser Ser Glu Glu Glu Pro
1145 1150 1155

Val Tyr Asn Gln Pro Ala Lys Asp Ser Arg Ile Ser Ser Arg Gly
1160 1165 1170

Ser Asp Glu Ser Thr Ala Ala Pro Ser Ala Gly Thr Gly Gly Ala
1175 1180 1185

Gly Leu Phe Thr Asp Leu Pro Pro Ser Asp Gly Val Asp Ala Asp
1190 1195 1200

Gly Gly Gly Pro Leu Gln Thr Val Arg Lys Lys Ala Glu Arg Leu
1205 1210 1215

Phe Asp Gln Leu Ser Arg Gln Val Phe Asn Leu Val Ser His Leu
1220 1225 1230

Pro Val Phe Phe Ser His Leu Phe Lys Ser Asp Ser Gly Tyr Ser
1235 1240 1245

Pro Gly Asp Trp Gly Phe Ala Ala Phe Thr Leu Phe Cys Leu Phe
1250 1255 1260

Leu Cys Tyr Ser Tyr Pro Phe Phe Gly Phe Val Pro Leu Leu Gly
1265 1270 1275

Val Phe Ser Gly Ser Ser Arg Arg Val Arg Met Gly Val Phe Gly
1280 1285 1290

Cys Trp Leu Ala Phe Ala Val Gly Leu Phe Lys Pro Val Ser Asp
1295 1300 1305

Pro Val Gly Thr Ala Cys Glu Phe Asp Ser Pro Glu Cys Arg Asn
1310 1315 1320

Val Leu His Ser Phe Glu Leu Leu Lys Pro Trp Asp Pro Val Arg
1325 1330 1335

Ser Leu Val Val Gly Pro Val Gly Leu Gly Leu Ala Ile Leu Gly
1340 1345 1350

Arg Leu Leu Gly Gly Ala Arg Tyr Ile Trp His Phe Leu Leu Arg
1355 1360 1365

Leu Gly Ile Val Ala Asp Cys Ile Leu Ala Gly Ala Tyr Val Leu
1370 1375 1380

Ser Gln Gly Arg Cys Lys Lys Cys Trp Gly Ser Cys Ile Arg Thr
1385 1390 1395

Ala Pro Asn Glu Ile Ala Phe Asn Val Phe Pro Phe Thr Arg Ala
1400 1405 1410

Thr Arg Ser Ser Leu Ile Asp Leu Cys Asp Arg Phe Cys Ala Pro
1415 1420 1425

Lys Gly Met Asp Pro Ile Phe Leu Ala Thr Gly Trp Arg Gly Cys
1430 1435 1440

Trp Thr Gly Arg Ser Pro Ile Glu Gln Pro Ser Glu Lys Pro Ile
1445 1450 1455

Ala Phe Ala Gln Leu Asp Glu Lys Arg Ile Thr Ala Arg Thr Val
1460 1465 1470

Val Ala Gln Pro Tyr Asp Pro Asn Gln Ala Val Lys Cys Leu Arg
1475 1480 1485

Val Leu Gln Ala Gly Gly Ala Met Val Ala Glu Ala Val Pro Lys
1490 1495 1500

Val Val Lys Val Ser Ala Ile Pro Phe Arg Ala Pro Phe Phe Pro
1505 1510 1515

Thr Gly Val Lys Val Asp Pro Glu Cys Arg Ile Val Val Asp Pro
1520 1525 1530

Asp Thr Phe Thr Thr Ala Leu Arg Ser Gly Tyr Ser Thr Thr Asn
1535 1540 1545

Leu Val Leu Gly Val Gly Asp Phe Ala Gln Leu Asn Gly Leu Lys
1550 1555 1560

Ile Arg Gln Ile Ser Lys Pro Ser Gly Gly Gly Pro His Leu Ile
1565 1570 1575

Ala Ala Leu His Val Ala Cys Ser Met Ala Leu His Met Leu Ala
1580 1585 1590

Gly Val Tyr Val Thr Ser Val Gly Ser Cys Gly Ala Gly Thr Asn
1595 1600 1605

Asp Pro Trp Cys Thr Asn Pro Phe Ala Val Pro Gly Tyr Gly Pro
1610 1615 1620

Gly Ser Leu Cys Thr Ser Arg Leu Cys Ile Ser Gln His Gly Leu
1625 1630 1635

Thr Leu Pro Leu Thr Ala Leu Val Ala Gly Phe Gly Leu Gln Glu
1640 1645 1650

Ile Ala Leu Val Val Leu Ile Phe Val Ser Ile Gly Gly Met Ala
1655 1660 1665

His Arg Leu Ser Cys Lys Ala Asp Met Leu Cys Ile Leu Leu Ala
1670 1675 1680

Ile Ala Ser Tyr Val Trp Val Pro Leu Thr Trp Leu Leu Cys Val
1685 1690 1695

Phe Pro Cys Trp Leu Arg Trp Phe Ser Leu His Pro Leu Thr Ile
1700 1705 1710

Leu Trp Leu Val Phe Phe Leu Ile Ser Val Asn Met Pro Ser Gly
1715 1720 1725

Ile Leu Ala Val Val Leu Leu Val Ser Leu Trp Leu Leu Gly Arg
1730 1735 1740

Tyr Thr Asn Ile Ala Gly Leu Val Thr Pro Tyr Asp Ile His His
1745 1750 1755

Tyr Thr Ser Gly Pro Arg Gly Val Ala Ala Leu Ala Thr Ala Pro
1760 1765 1770

Asp Gly Thr Tyr Leu Ala Ala Val Arg Arg Ala Ala Leu Thr Gly
1775 1780 1785

Arg Thr Met Leu Phe Thr Pro Ser Gln Leu Gly Ser Leu Leu Glu
1790 1795 1800

Gly Ala Phe Arg Thr Arg Lys Pro Ser Leu Asn Thr Val Asn Val
1805 1810 1815

Val Gly Ser Ser Met Gly Ser Gly Gly Val Phe Thr Ile Asp Gly
1820 1825 1830

Lys Ile Arg Cys Val Thr Ala Ala His Val Leu Thr Gly Asn Ser
1835 1840 1845

Ala Arg Val Ser Gly Val Gly Phe Asn Gln Met Leu Asp Phe Asp
1850 1855 1860

Val Lys Gly Asp Phe Ala Ile Ala Asp Cys Pro Asn Trp Gln Gly
1865 1870 1875

Ala Ala Pro Lys Thr Gln Phe Cys Glu Asp Gly Trp Ala Gly Arg
1880 1885 1890

Ala Tyr Trp Leu Thr Ser Ser Gly Val Glu Pro Gly Val Ile Gly
1895 1900 1905

Asn Gly Phe Ala Phe Cys Phe Thr Ala Cys Gly Asp Ser Gly Ser
1910 1915 1920

Pro Val Ile Thr Glu Ala Gly Glu Leu Val Gly Val His Thr Gly
1925 1930 1935

Ser Asn Lys Gln Gly Gly Gly Ile Val Thr Arg Pro Ser Gly Gln
1940 1945 1950

Phe Cys Asn Val Ala Pro Ile Lys Leu Ser Glu Leu Ser Glu Phe
1955 1960 1965

Phe Ala Gly Pro Lys Val Pro Leu Gly Asp Val Lys Val Gly Ser
1970 1975 1980

His Ile Ile Lys Asp Thr Cys Glu Val Pro Ser Asp Leu Cys Ala
1985 1990 1995

Leu Leu Ala Ala Lys Pro Glu Leu Glu Gly Gly Leu Ser Thr Val
2000 2005 2010

Gln Leu Leu Cys Val Phe Phe Leu Leu Trp Arg Met Met Gly His
2015 2020 2025

Ala Trp Thr Pro Leu Val Ala Val Gly Phe Phe Ile Leu Asn Glu
2030 2035 2040

Val Leu Pro Ala Val Leu Val Arg Ser Val Phe Ser Phe Gly Met
2045 2050 2055

Phe Val Leu Ser Trp Leu Thr Pro Trp Ser Ala Gln Val Leu Met
2060 2065 2070

Ile Arg Leu Leu Thr Ala Ala Leu Asn Arg Asn Arg Trp Ser Leu
2075 2080 2085

Ala Phe Tyr Ser Leu Gly Ala Val Thr Gly Phe Val Ala Asp Leu
2090 2095 2100

Ala Ala Thr Gln Gly His Pro Leu Gln Ala Val Met Asn Leu Ser
2105 2110 2115

Thr Tyr Ala Phe Leu Pro Arg Met Met Val Val Thr Ser Pro Val
2120 2125 2130

Pro Val Ile Ala Cys Gly Val Val His Leu Leu Ala Ile Ile Leu
2135 2140 2145

Tyr Leu Phe Lys Tyr Arg Gly Leu His Asn Val Leu Val Gly Asp
2150 2155 2160

Gly Ala Phe Ser Ala Ala Phe Phe Leu Arg Tyr Phe Ala Glu Gly
2165 2170 2175

Lys Leu Arg Glu Gly Val Ser Gln Ser Cys Gly Met Asn His Glu
2180 2185 2190

Ser Leu Thr Gly Ala Leu Ala Met Arg Leu Asn Asp Glu Asp Leu
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Asp Phe Leu Thr Lys Trp Thr Asp Phe Lys Cys Phe Val Ser Ala
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Ser Asn Met Arg Asn Ala Ala Gly Gln Phe Ile Glu Ala Ala Tyr
2225 2230 2235

Ala Lys Ala Leu Arg Ile Glu Leu Ala Gln Leu Val Gln Val Asp
2240 2245 2250

Lys Val Arg Gly Thr Leu Ala Lys Leu Glu Ala Phe Ala Asp Thr
2255 2260 2265

Val Ala Pro Gln Leu Ser Pro Gly Asp Ile Val Val Ala Leu Gly
2270 2275 2280

His Thr Pro Val Gly Ser Ile Phe Asp Leu Lys Val Gly Gly Thr
2285 2290 2295

Lys His Thr Leu Gln Val Ile Glu Thr Arg Val Leu Ala Gly Ser
2300 2305 2310

Lys Met Thr Val Ala Arg Val Val Asp Pro Thr Pro Thr Pro Pro
2315 2320 2325

Pro Ala Pro Val Pro Ile Pro Leu Pro Pro Lys Val Leu Glu Asn
2330 2335 2340

Gly Pro Asn Ala Trp Gly Asp Gly Asp Arg Leu Asn Lys Lys Lys
2345 2350 2355

Arg Arg Arg Met Glu Thr Val Gly Ile Phe Val Met Gly Gly Lys
2360 2365 2370

Lys Tyr Gln Lys Phe Trp Asp Lys Asn Ser Gly Asp Val Phe Tyr
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Glu Glu Val His Asp Asn Thr Asp Ala Trp Glu Cys Leu Arg Val
2390 2395 2400

Gly Asp Pro Ala Asp Phe Asp Pro Glu Lys Gly Thr Leu Cys Gly
2405 2410 2415

His Thr Thr Ile Glu Asp Lys Asp Tyr Lys Val Tyr Ala Ser Pro
2420 2425 2430

Ser Gly Lys Lys Phe Leu Val Pro Val Asn Ser Glu Ser Gly Arg
2435 2440 2445

Ala Gln Trp Glu Ala Ala Lys Leu Ser Val Glu Gln Ala Leu Gly
2450 2455 2460

Met Met Asn Val Asp Gly Glu Leu Thr Ala Lys Glu Val Glu Lys
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Leu Lys Arg Ile Ile Asp Lys Leu Gln Gly Leu Thr Lys Glu Gln
2480 2485 2490

Cys Leu Asn Cys
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<213> Arterivirus porcine respiratory and reproductive syndrome virus

<400> 26

Met Lys Trp Gly Leu Tyr Lys Ala Ser Ser Thr Lys Leu Ala Ser Phe
1 5 10 15

Leu Trp Met Leu Ser Arg Asn Phe Trp Cys Pro Leu Leu Ile Ser Ser
20 25 30

Tyr Phe Trp Pro Phe Cys Leu Ala Ser Pro Ser Pro Val Gly Trp Trp
35 40 45

Ser Phe Ala Ser Asp Trp Phe Ala Pro Arg Tyr Ser Val Arg Ala Leu
50 55 60

Pro Phe Thr Leu Ser Asn Tyr Arg Arg Ser Tyr Glu Ala Phe Leu Ser
65 70 75 80

Gln Cys Arg Val Asp Ile Pro Thr Trp Gly Val Lys His Pro Leu Gly
85 90 95

Met Phe Trp His His Lys Val Ser Thr Leu Ile Asp Glu Met Val Ser
100 105 110

Arg Arg Met Tyr Arg Ile Met Glu Lys Ala Gly Gln Ala Ala Trp Lys
115 120 125

Gln Val Val Ser Glu Ala Thr Leu Ser Arg Ile Ser Ser Leu Asp Val
130 135 140

Val Ala His Phe Gln His Leu Ala Ala Ile Glu Ala Glu Thr Cys Lys
145 150 155 160

Tyr Leu Ala Ser Arg Leu Pro Met Leu His Asn Leu Arg Met Thr Gly
165 170 175

Ser Asn Val Thr Ile Val Tyr Asn Ser Thr Leu Asn Gln Val Phe Ala
180 185 190

Ile Phe Pro Thr Pro Gly Ser Arg Pro Lys Leu His Asp Phe Gln Gln
195 200 205

Trp Leu Ile Ala Val His Ser Ser Ile Phe Ser Ser Val Ala Ala Ser
210 215 220

Cys Thr Leu Phe Val Val Leu Trp Leu Arg Val Pro Met Leu Arg Thr
225 230 235 240

Val Phe Gly Phe Arg Trp Leu Gly Ala Ile Phe Leu Ser Asn Ser Trp
245 250 255

<210> 27
<211> 178
<212> PRT

<213> Arterivirus porcine respiratory and reproductive syndrome virus

<400> 27

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Met Ala Ala Ser Leu Leu Phe Leu Leu Val Gly Phe Lys Cys Phe Val
1               5                  10                  15

Val Ser Gln Ala Phe Ala Cys Lys Pro Cys Phe Ser Ser Ser Leu Ser
            20                  25                  30

Asp Ile Lys Thr Asn Thr Thr Ala Ala Ser Gly Phe Val Val Leu Gln
        35                  40                  45

Asp Ile Ser Cys Leu Arg His Gly Asp Ser Ser Phe Pro Thr Ile Arg
    50                  55                  60

Lys Ser Ser Gln Cys Arg Thr Ala Ile Gly Thr Pro Val Tyr Ile Thr
65                  70                  75                  80

Ile Thr Ala Asn Val Thr Asp Glu Asn Tyr Leu His Ser Ser Asp Leu
                85                  90                  95

Leu Met Leu Ser Ser Cys Leu Phe Tyr Ala Ser Glu Met Ser Glu Lys
            100                 105                 110

Gly Phe Lys Val Val Phe Gly Asn Val Ser Gly Ile Val Ala Val Cys
        115                 120                 125

Val Asn Phe Thr Ser Tyr Val Gln His Val Lys Glu Phe Thr Gln Arg
    130                 135                 140
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Ser Leu Val Val Asp His Val Arg Leu Leu His Phe Met Thr Pro Glu
145 150 155 160

Thr Met Arg Trp Ala Thr Val Leu Ala Cys Leu Phe Ala Ile Leu Leu
165 170 175

Ala Ile

<210> 28
<211> 200
<212> PRT
<213> Arterivirus porcine respiratory and reproductive syndrome virus

<400> 28

Met Leu Gly Lys Cys Leu Thr Ala Gly Cys Cys Ser Arg Leu Leu Ser
1 5 10 15

Leu Trp Cys Ile Val Pro Phe Cys Phe Ala Val Leu Gly Ser Ala Asn
20 25 30

Ser Ser Ser Ser Ser His Phe Gln Leu Ile Tyr Asn Leu Thr Leu Cys
35 40 45

Glu Leu Asn Gly Thr Asp Trp Leu Ala Glu Lys Phe Asp Trp Ala Val
50 55 60

Glu Thr Phe Val Ile Phe Pro Val Leu Thr His Ile Val Ser Tyr Gly
65 70 75 80

Ala Leu Thr Thr Ser His Phe Leu Asp Thr Val Gly Leu Val Thr Val

85 90 95

Ser Thr Ala Gly Phe Tyr His Gly Arg Tyr Val Leu Ser Ser Ile Tyr
100 105 110

Ala Val Cys Ala Leu Ala Ala Leu Ile Cys Phe Val Ile Arg Leu Ala
115 120 125

Lys Asn Cys Met Ser Trp Arg Tyr Ser Cys Thr Arg Tyr Thr Asn Phe
130 135 140

Leu Leu Asp Thr Lys Gly Arg Leu Tyr Arg Trp Arg Ser Pro Val Ile
145 150 155 160

Ile Glu Lys Gly Gly Lys Val Glu Val Glu Gly His Leu Ile Asp Leu
165 170 175

Lys Arg Val Val Leu Asp Gly Ser Val Ala Thr Pro Leu Thr Arg Val
180 185 190

Ser Ala Glu Gln Trp Gly Arg Leu
195 200

<210> 29
<211> 123
<212> PRT
<213> Arterivirus porcine respiratory and reproductive syndrome virus

<400> 29

Met Pro Asn Asn Asn Gly Lys Gln Gln Lys Lys Lys Lys Gly Asn Gly
1 5 10 15

Gln Pro Val Asn Gln Leu Cys Gln Met Leu Gly Lys Ile Ile Ala Gln
20 25 30

Gln Asn Gln Ser Arg Gly Lys Gly Pro Gly Lys Lys Ser Lys Lys Lys
35 40 45

Asn Pro Glu Lys Pro His Phe Pro Leu Ala Thr Glu Asp Asp Val Arg
50 55 60

His His Phe Thr Pro Gly Glu Arg Gln Leu Cys Leu Ser Ser Ile Gln
65 70 75 80

Thr Ala Phe Asn Gln Gly Ala Gly Thr Cys Thr Leu Ser Asp Ser Gly
85 90 95

Arg Ile Ser Tyr Thr Val Glu Phe Ser Leu Pro Thr His His Thr Val
100 105 110

Arg Leu Ile Arg Val Thr Ala Ser Pro Ser Ala
115 120

<210> 30
<211> 1463
<212> PRT
<213> Arterivirus porcine respiratory and reproductive syndrome virus

<220>
<221> MISC_FEATURE
<222> (1)..(1457)
<223> ORF 1b, nucleotides 7682 to 12055 of the viral sequence

<220>
<221> MISC_FEATURE
<222> (1)..(1457)
<223> ORF 1b, nucleotides 7664 to 12055 of the viral sequence

<400> 30

Gly Ala Val Phe Lys Leu Leu Ala Ala Ser Gly Leu Thr Arg Cys Gly
1 5 10 15

Arg Gly Gly Leu Val Val Thr Glu Thr Ala Val Lys Ile Val Lys Phe
20 25 30

His Asn Arg Thr Phe Thr Leu Gly Pro Val Asn Leu Lys Val Ala Ser
35 40 45

Glu Val Glu Leu Lys Asp Ala Val Glu His Asn Gln His Pro Val Ala
50 55 60

Arg Pro Val Asp Gly Gly Val Val Leu Leu Arg Ser Ala Val Pro Ser
65 70 75 80

Leu Ile Asp Val Leu Ile Ser Gly Ala Asp Ala Ser Pro Lys Leu Leu
85 90 95

Ala Arg His Gly Pro Gly Asn Thr Gly Ile Asp Gly Thr Leu Trp Asp
100 105 110

Phe Glu Ala Glu Ala Thr Lys Glu Glu Ile Ala Leu Ser Ala Gln Ile
115 120 125

Ile Gln Ala Cys Asp Ile Arg Arg Gly Asp Ala Pro Glu Ile Gly Leu
130 135 140

Pro Tyr Lys Leu Tyr Pro Val Arg Gly Asn Pro Glu Arg Val Lys Gly
145 150 155 160

Val Leu Gln Asn Thr Arg Phe Gly Asp Ile Pro Tyr Lys Thr Pro Ser
165 170 175

Asp Thr Gly Ser Pro Val His Ala Ala Ala Cys Leu Thr Pro Asn Ala
180 185 190

Thr Pro Val Thr Asp Gly Arg Ser Val Leu Ala Thr Thr Met Pro Ser
195 200 205

Gly Phe Glu Leu Tyr Val Pro Thr Ile Pro Ala Ser Val Leu Asp Tyr
210 215 220

Leu Asp Ser Arg Pro Asp Cys Pro Lys Gln Leu Thr Glu His Gly Cys
225 230 235 240

Glu Asp Ala Ala Leu Arg Asp Leu Ser Lys Tyr Asp Leu Ser Thr Gln
245 250 255

Gly Phe Val Leu Pro Gly Val Leu Arg Leu Val Arg Lys Tyr Leu Phe
260 265 270

Ala His Val Gly Lys Cys Pro Pro Val His Arg Pro Ser Thr Tyr Pro
275 280 285

Ala Lys Asn Ser Met Ala Gly Ile Asn Gly Asn Arg Phe Pro Thr Lys
290 295 300

Asp Ile Gln Ser Val Pro Glu Ile Asp Val Leu Cys Ala Gln Ala Val
305 310 315 320

Arg Glu Asn Trp Gln Thr Val Thr Pro Cys Thr Leu Lys Lys Gln Tyr
325 330 335

Cys Gly Lys Lys Lys Thr Arg Thr Ile Leu Gly Thr Asn Asn Phe Ile
340 345 350

Ala Leu Ala His Arg Ala Ala Leu Ser Gly Val Thr Gln Gly Phe Met
355 360 365

Lys Lys Ala Phe Asn Ser Pro Ile Ala Leu Gly Lys Asn Lys Phe Lys
370 375 380

Glu Leu Gln Thr Pro Val Leu Gly Arg Cys Leu Glu Ala Asp Leu Ala
385 390 395 400

Ser Cys Asp Arg Ser Thr Pro Ala Ile Val Arg Trp Phe Ala Ala Asn
405 410 415

Leu Leu Tyr Glu Leu Ala Cys Ala Glu Glu His Leu Pro Ser Tyr Val
420 425 430

Leu Asn Cys Cys His Asp Leu Leu Val Thr Gln Ser Gly Ala Val Thr
435 440 445

Lys Arg Gly Gly Leu Ser Ser Gly Asp Pro Ile Thr Ser Val Ser Asn
450 455 460

Thr Ile Tyr Ser Leu Val Ile Tyr Ala Gln His Met Val Leu Ser Tyr
465 470 475 480

Phe Lys Ser Gly His Pro His Gly Leu Leu Phe Leu Gln Asp Gln Leu
485 490 495

Lys Phe Glu Asp Met Leu Lys Val Gln Pro Leu Ile Val Tyr Ser Asp
500 505 510

Asp Leu Val Leu Tyr Ala Glu Ser Pro Thr Met Pro Asn Tyr His Trp
515 520 525

Trp Val Glu His Leu Asn Leu Met Leu Gly Phe Gln Thr Asp Pro Lys
530 535 540

Lys Thr Ala Ile Thr Asp Ser Pro Ser Phe Leu Gly Cys Arg Ile Ile
545 550 555 560

Asn Gly Arg Gln Leu Val Pro Asn Arg Asp Arg Ile Leu Ala Ala Leu
565 570 575

Ala Tyr His Met Lys Ala Ser Asn Val Ser Glu Tyr Tyr Ala Ala Ala
580 585 590

Ala Ala Ile Leu Met Asp Ser Cys Ala Cys Leu Glu Tyr Asp Pro Glu
595 600 605

Trp Phe Glu Glu Leu Val Val Gly Ile Ala Gln Cys Ala Arg Lys Asp
610 615 620

Gly Tyr Ser Phe Pro Gly Pro Pro Phe Phe Leu Ser Met Trp Glu Lys
625 630 635 640

Leu Arg Ser Asn His Glu Gly Lys Lys Ser Arg Met Cys Gly Tyr Cys
645 650 655

Gly Ala Pro Ala Pro Tyr Ala Thr Ala Cys Gly Leu Asp Val Cys Ile
660 665 670

Tyr His Thr His Phe His Gln His Cys Pro Val Ile Ile Trp Cys Gly
675 680 685

His Pro Ala Gly Ser Gly Ser Cys Ser Glu Cys Lys Pro Pro Leu Gly
690 695 700

Lys Gly Thr Ser Pro Leu Asp Glu Val Leu Glu Gln Val Pro Tyr Lys
705 710 715 720

Pro Pro Arg Thr Val Ile Met His Val Glu Gln Gly Leu Thr Pro Leu
725 730 735

Asp Pro Gly Arg Tyr Gln Thr Arg Arg Gly Leu Val Ser Val Arg Arg
740 745 750

Gly Ile Arg Gly Asn Glu Val Asp Leu Pro Asp Gly Asp Tyr Ala Ser
755 760 765

Thr Ala Leu Leu Pro Thr Cys Lys Glu Ile Asn Met Val Ala Val Ala
770 775 780

Ser Asn Val Leu Arg Ser Arg Phe Ile Ile Gly Pro Pro Gly Ala Gly
785 790 795 800

Lys Thr Tyr Trp Leu Leu Gln Gln Val Gln Asp Gly Asp Val Ile Tyr
805 810 815

Thr Pro Thr His Gln Thr Met Leu Asp Met Ile Arg Ala Leu Gly Thr
820 825 830

Cys Arg Phe Asn Val Pro Ala Gly Thr Thr Leu Gln Phe Pro Ala Pro
835 840 845

Ser Arg Thr Gly Pro Trp Val Arg Ile Leu Ala Gly Gly Trp Cys Pro
850 855 860

Gly Lys Asn Ser Phe Leu Asp Glu Ala Ala Tyr Cys Asn His Leu Asp
865 870 875 880

Val Leu Arg Leu Leu Ser Lys Thr Thr Leu Thr Cys Leu Gly Asp Phe
885 890 895

Lys Gln Leu His Pro Val Gly Phe Asp Ser His Cys Tyr Val Phe Asp
900 905 910

Ile Met Pro Gln Thr Gln Leu Lys Thr Ile Trp Arg Phe Gly Gln Asn
915 920 925

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Ile Cys Asp Ala Ile Gln Pro Asp Tyr Arg Asp Lys Leu Val Ser Met
    930                 935                 940

Val Asn Thr Thr Arg Val Thr Tyr Met Glu Lys Pro Val Lys Tyr Gly
945                 950                 955                 960

Gln Val Leu Thr Pro Tyr His Arg Asp Arg Glu Asp Gly Ala Ile Thr
                965                 970                 975

Ile Asp Ser Ser Gln Gly Ala Thr Phe Asp Val Val Thr Leu His Leu
            980                 985                 990

Pro Thr Lys Asp Ser Leu Asn Arg  Gln Arg Ala Leu Val  Ala Ile Thr
        995                 1000                1005

Arg Ala  Arg His Ala Ile Phe  Val Tyr Asp Pro His  Arg Gln Leu
    1010                1015                1020

Gln Ser  Met Phe Asp Leu Pro  Ala Lys Gly Thr Pro  Val Asn Leu
    1025                1030                1035

Ala Val  His Arg Asp Glu Gln  Leu Ile Val Leu Asp  Arg Asn Asn
    1040                1045                1050

Lys Glu  Cys Thr Val Ala Gln  Ala Ile Gly Asn Gly  Asp Lys Phe
    1055                1060                1065

Arg Ala  Thr Asp Lys Arg Val  Val Asp Ser Leu Arg  Ala Ile Cys
    1070                1075                1080
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Ala Asp  Leu Glu Gly Ser Ser  Ser Pro Leu Pro Lys  Val Ala His
    1085                1090                1095

Asn Leu  Gly Phe Tyr Phe Ser  Pro Asp Leu Thr Gln  Phe Ala Lys
    1100                1105                1110

Leu Pro  Val Asp Leu Ala Pro  His Trp Pro Val Val  Thr Thr Gln
    1115                1120                1125

Asn Asn  Glu Lys Trp Pro Asp  Arg Leu Val Ala Ser  Leu Arg Pro
    1130                1135                1140

Val His  Lys Tyr Ser Arg Ala  Cys Ile Gly Ala Gly  Tyr Met Val
    1145                1150                1155

Gly Pro  Ser Val Phe Leu Gly  Thr Pro Gly Val Val  Ser Tyr Tyr
    1160                1165                1170

Leu Thr  Lys Phe Val Lys Gly  Glu Ala Gln Val Leu  Pro Glu Thr
    1175                1180                1185

Val Phe  Ser Thr Gly Arg Ile  Glu Val Asp Cys Arg  Glu Tyr Leu
    1190                1195                1200

Asp Asp  Arg Glu Arg Glu Val  Ala Glu Ser Leu Pro  His Ala Phe
    1205                1210                1215

Ile Gly  Asp Val Lys Gly Thr  Thr Val Gly Gly Cys  His His Val
    1220                1225                1230
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Thr Ser Lys Tyr Leu Pro Arg Phe Leu Pro Lys Glu Ser Val Ala
1235 1240 1245

Val Val Gly Val Ser Ser Pro Gly Lys Ala Ala Lys Ala Val Cys
1250 1255 1260

Thr Leu Thr Asp Val Tyr Leu Pro Asp Leu Glu Ala Tyr Leu His
1265 1270 1275

Pro Glu Thr Gln Ser Lys Cys Trp Lys Val Met Leu Asp Phe Lys
1280 1285 1290

Glu Val Arg Leu Met Val Trp Lys Asp Lys Thr Ala Tyr Phe Gln
1295 1300 1305

Leu Glu Gly Arg Tyr Phe Thr Trp Tyr Gln Leu Ala Ser Tyr Ala
1310 1315 1320

Ser Tyr Ile Arg Val Pro Val Asn Ser Thr Val Tyr Leu Asp Pro
1325 1330 1335

Cys Met Gly Pro Ala Leu Cys Asn Arg Arg Val Val Gly Ser Thr
1340 1345 1350

His Trp Gly Ala Asp Leu Ala Val Thr Pro Tyr Asp Tyr Gly Ala
1355 1360 1365

Lys Ile Ile Leu Ser Ser Ala Tyr His Gly Glu Met Pro Pro Gly
1370 1375 1380

Tyr Lys Ile Leu Ala Cys Ala Glu Phe Ser Leu Asp Asp Pro Val
1385 1390 1395

Lys Tyr Lys His Thr Trp Gly Phe Glu Ser Asp Thr Ala Tyr Leu
1400 1405 1410

Tyr Glu Phe Thr Gly Asn Gly Glu Asp Trp Glu Asp Tyr Asn Asp
1415 1420 1425

Ala Phe Arg Ala Arg Gln Lys Gly Lys Ile Tyr Lys Ala Thr Ala
1430 1435 1440

Thr Ser Met Lys Phe Tyr Phe Pro Pro Gly Pro Val Ile Glu Pro
1445 1450 1455

Thr Leu Gly Leu Asn
1460

<210> 31
<211> 254
<212> PRT
<213> Arterivirus porcine respiratory and reproductive syndrome virus

<220>
<221> MISC_FEATURE
<222> (1)..(254)
<223> GP3 (ORF 3), nucleotides 12680 to 13444 of the viral sequence

<400> 31

Met Ala Asn Ser Cys Thr Phe Leu His Ile Phe Leu Cys Cys Ser Phe
1 5 10 15

Leu Tyr Ser Phe Cys Cys Ala Val Val Ala Gly Ser Asn Ala Thr Tyr
20 25 30

Cys Phe Trp Phe Pro Leu Val Arg Gly Asn Phe Ser Phe Glu Leu Met
35 40 45

Val Asn Tyr Thr Val Cys Pro Pro Cys Leu Thr Arg Gln Ala Ala Ala
50 55 60

Glu Val Leu Glu Pro Gly Arg Ser Leu Trp Cys Arg Ile Gly His Asp
65 70 75 80

Arg Cys Gly Glu Asp Asp His Asp Glu Leu Gly Phe Met Val Pro Pro
85 90 95

Gly Leu Ser Ser Glu Ser His Leu Thr Ser Val Tyr Ala Trp Leu Ala
100 105 110

Phe Leu Ser Phe Ser Tyr Thr Ala Gln Phe His Pro Glu Ile Phe Gly
115 120 125

Ile Gly Asn Val Ser Glu Val Tyr Val Asp Ile Lys His Gln Phe Ile
130 135 140

Cys Ala Val His Asp Gly Gln Asn Thr Thr Leu Pro Arg His Asp Asn
145 150 155 160

Ile Ser Ala Val Phe Gln Thr Tyr Tyr Gln His Gln Val Asp Gly Gly
165 170 175

Asn Trp Phe His Leu Glu Trp Leu Arg Pro Phe Phe Ser Ser Trp Leu
180 185 190

Val Leu Asn Val Ser Trp Phe Leu Arg Arg Ser Pro Ala Ser His Val
195 200 205

Ser Val Arg Val Phe Gln Thr Ser Lys Pro Thr Leu Pro Gln His Gln
210 215 220

Ala Leu Leu Ser Ser Arg Thr Ser Ala Ala Leu Gly Met Ala Thr Arg
225 230 235 240

Pro Phe Arg Arg Phe Ala Lys Ala Leu Asn Ala Ala Arg Arg
245 250

<210> 32
<211> 174
<212> PRT
<213> Arterivirus porcine respiratory and reproductive syndrome virus

<220>
<221> MISC_FEATURE
<222> (1)..(174)
<223> Protein M (ORF 6), nucleotides 14359 to 14883 of the viral sequence

<400> 32

Met Gly Ser Ser Leu Asp Asp Phe Cys His Asp Ser Thr Ala Pro Gln
1 5 10 15

Lys Val Leu Leu Ala Phe Ser Ile Thr Tyr Thr Pro Val Met Ile Tyr

20 25 30

Ala Leu Lys Val Ser Arg Gly Arg Leu Leu Gly Leu Leu His Leu Leu
35 40 45

Ile Phe Leu Asn Cys Ala Phe Thr Phe Gly Tyr Met Thr Phe Glu His
50 55 60

Phe Gln Ser Thr Asn Arg Val Ala Leu Thr Met Gly Ala Val Val Ala
65 70 75 80

Leu Leu Trp Gly Val Tyr Ser Ala Ile Glu Thr Trp Lys Phe Ile Thr
85 90 95

Ser Arg Cys Arg Leu Cys Leu Leu Gly Arg Lys Tyr Ile Leu Ala Pro
100 105 110

Ala His His Val Glu Ser Ala Ala Gly Phe His Pro Ile Ala Ala Asn
115 120 125

Asp Asn His Ala Phe Val Val Arg Arg Pro Gly Ser Thr Thr Val Asn
130 135 140

Gly Thr Leu Val Pro Gly Leu Lys Ser Leu Val Leu Gly Gly Arg Lys
145 150 155 160

Ala Val Lys Gln Gly Val Val Asn Leu Val Lys Tyr Ala Lys
165 170